Claims

1. An apparatus for stacking objects, wherein at least several of said objects have different shapes and/or dimensions, the apparatus being provided with positioning means (3) which are designed for ranging the objects (2) in specific, substantially horizontal stacking patterns (P), while the apparatus (1) is provided with conveying means (4, 14) which are designed for conveying the objects (2) from the positioning means (3) to a stacking area (G) for stacking the objects (2) onto each other, the conveying means (4, 14) being at least provided with a first conveyor (4, 14) designed for supporting each object (2) during transport at an underside, the apparatus (1) being provided with stacking pattern maintaining means (5) which are at least designed for substantially maintaining said stacking patterns (P) during the stacking of each object (2) in the stacking area (G), while said maintaining means (5) are designed for substantially maintaining said stacking patterns (P) during transport of the objects (2) from the positioning means (3) to the stacking area.

2. An apparatus according to claim 1, wherein at least a number of said stacking patterns are provided with one or more spaces (9) without objects.

3. An apparatus according to claim 2, wherein said positioning means are designed for positioning objects (2) such that said spaces (9) without objects are obtained.

4. An apparatus according to claim 2 or 3, wherein the maintaining means (5) are designed for filling the spaces (9) without objects at least partly with filling means (15) for the purpose of maintaining said stacking patterns (P).

5. An apparatus according to claim 4, wherein the maintaining means (5) are designed for introducing the filling means (15) into said

spaces (9) without objects after an associated stacking pattern (P) has been formed by the positioning means (3) from said objects (2).

6. An apparatus according to claim 4 or 5, wherein the maintaining means (5) are designed for removing said filling means (15) from said spaces (9) without objects after associated stacking patterns (P) have been introduced into the stacking area (G).

7. An apparatus according to any one of claims 4 – 6, wherein the maintaining means (5) are provided with at least one filling means holder (16), while said filling means (15) have been coupled to said filling means holder (16).

8. An apparatus according to claim 7, wherein the filling means holder (16) is movable at least in vertical direction for bringing filling means (15) into and/or out of said spaces (9) without objects of a stacking pattern (P).

9. An apparatus according to any one of claims 4 – 8, wherein said filling means comprise filling elements (15) which are each disposed so as to be movable at least in vertical direction.

10. An apparatus according to claims 7 and 9, wherein the filling elements (15) are each coupled to the filling means holder (16) so as to be movable, in particular slideable, each in substantially vertical direction.

11. An apparatus according to claim 9 or 10, provided with drive means (17) for moving the filling elements (15') each in vertical direction (Z, Z').

12. An apparatus according to any one of claims 9 – 11, wherein each filling element (15) is also pivotable through a particular angle (α) about a horizontal pivot, at least when the filling element (15) is in a position moved downwards.

13. An apparatus according to any one of claims 9 – 12, wherein each filling element is provided with a flexible, elongated guide part and a rigid fixation part movable along the guide part.

14. An apparatus according to any one of the preceding claims, wherein said maintaining means (5) are movable in a direction (X) from the positioning means (3) to the stacking area (G), for the purpose of maintaining said stacking patterns (P) during transport of the objects (2).

15. An apparatus according to claim 14, wherein said maintaining means (5) after stacking the objects, can each time be moved back from the stacking area (G) to the positioning means (3) preferably such that the returning maintaining means (5) are at a distance from the following conveyed objects (2).

16. An apparatus according to any one of the preceding claims, provided with guide means (6) for instance rails, for guiding the maintaining means (5) at least in one direction from the positioning means (3) to the stacking area (G) and preferably also in opposite direction.

17. An apparatus according to any one of the preceding claims, wherein said maintaining means (5) are designed for engaging said objects (2) after the objects (2) have been ranged by the positioning means (2) in said stacking patterns (P).

18. An apparatus according to any one of the preceding claims, wherein said maintaining means (5) are designed for engaging said objects (2) before the objects (2) are conveyed to the stacking area (G) by said conveying means (4, 14).

19. An apparatus according to any one of the preceding claims, wherein the maintaining means (5) are designed for engaging at least one other side than said underside of an object (2) for holding the object (2) in a particular object position of the associated stacking pattern (P) on the at least first conveyor (4).

20. An apparatus according to any one of the preceding claims, wherein the first conveyor (4) can be moved from a first position outside the stacking area (G) to a second position within the stacking area (G) and in opposite direction, for bringing objects (2) into the stacking area (G).

21. An apparatus according to claim 20, wherein the maintaining means (5) are at least designed for substantially maintaining a horizontal position of each object (2) introduced by the first conveyor (4) into the stacking area (G) when the first conveyor (4) moves from the second to the first position.

22. An apparatus according to any one of the preceding claims, wherein the maintaining means (5) are at least designed to substantially prevent a movement, accompanying the first conveyor, of each object (2) introduced into the stacking area (G) by the first conveyor (4), when the first conveyor (4) moves from the second to the first position, while the maintaining means (5) are, in particular, designed for stopping an object (2) at least in horizontal direction when the first conveyor (4) moves from the second to the first position.

23. An apparatus according to any one of the preceding claims, wherein said first conveyor comprises at least one movable plate, for instance at least one telescopically extending plate.

24. An apparatus according to any one of the preceding claims, provided with at least a second conveyor (14) extending between said positioning means (3) and said first conveyor (4).

25. An apparatus according to any one of the preceding claims, wherein the maintaining means (5) are at least designed for engaging sides lying free of objects (2) ranged in the stacking patterns (P), at least during the stacking of the objects (2) in the stacking area (G).

26. An apparatus according to any one of the preceding claims, wherein at least said stacking patterns are two-dimensional patterns.

27. An apparatus according to any one of the preceding claims, wherein the positioning means (3) are designed for, each time, forming a successive stacking pattern (P1) which is substantially complementary to a previously formed stacking pattern (P0).

28. An apparatus according to any one of the preceding claims, wherein the positioning means (3) are designed for successively forming at least two

stacking patterns (P0, P1) of objects (2) such that in a stacked condition, a top side of the at least two stacking patterns (P0, P1) extends along a substantially horizontal plane.

29. An apparatus according to at least claim 3, wherein the positioning means (3) are designed for, first, collecting the objects (2) and, thereupon, spreading them relative to each other in at least one direction (X', Y') for forming said spaces without objects.

30. An apparatus according to at least claim 29, wherein the positioning means (3) are provided with at least one spreading station (B, C) which is designed for spreading a compressed layer of objects (2) in a respective spreading direction (X', Y'), the positioning means preferably being provided with at least two spreading stations (B, C) which are designed for successively spreading objects (2) in different spreading directions (X', Y').

31. Use of an apparatus according to any one of the preceding claims for stacking objects (2).

32. A method for stacking objects, for instance utilizing an apparatus according to any one of claims 1 – 30, wherein objects (2) are ranged in specific, substantially horizontal stacking patterns (P), while then, the objects (2) are conveyed by a conveyor (4) to a stacking area (G) to be stacked, the conveyor (4) being designed for supporting each object during transport at an underside, while maintaining means (5) substantially maintain said stacking patterns (P) during stacking of each object (2) in the stacking area (G), the maintaining means (5) moving along with the objects (2) during transport of the objects to the stacking area (G).

33. A method according to claim 32, wherein at least a number of said stacking patterns (P) are provided with one or more spaces (9) without objects, while said spaces (9) without objects are maintained by the maintaining means during stacking of the stacking patterns (P).

34. A method according to claim 33, wherein filling means are introduced, at least partly, into said spaces (9) without objects for maintaining the stacking patterns (P).

35. A method according to claim 34, wherein the filling means are each time removed from a stacking pattern (P) during and/or after the stacking of associated products (2).

36. A method according to any one of claims 33 – 35, wherein the objects (2) are first collected, and are then spread relative to each other in at least one direction (X', Y') for forming said spaces without objects.

37. A goods distribution system, provided with an apparatus according to any one of claims 1 – 30.

38. A stack, stacked by an apparatus according to any one of claims 1 - 30 and/or with a method according to any one of claims 32 – 36.